EMERGENCY ACTION PLAN

BIG SKY SEWER DAMS

Big Sky Water and Sewer District 363
P.O. Box 160670
Big Sky, Montana 59716

November 1, 1997
Revised August 1, 1999
Revised March 5, 2001
Revised April 30, 2003
updated May 10, 2006
May 2, 2007
Aug 4, 2008

IF BIG SKY SEWER DAMS ARE FAILING OR FAILURE SEEMS IMMINENT, CALL:

BIG SKY COUNTY SHERIFF 911

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I. INTRODUCTION

A. Purpose

The purpose of this emergency action plan (EAP) is primarily to safeguard lives and secondarily to reduce property damage to the citizens of Gallatin County living near the town of Big Sky, and along West Fork of the Gallatin River, in the event of flooding caused by a failure of Big Sky Sewer Storage Ponds.

B. Description of Ponds

Big Sky Ponds is in Gallatin County, in the Gallatin Peak Quadrangle, Section 31, Township, (T6S), Range, (R4E), and located on the West Fork of the Gallatin River in Big Sky Meadow Village, a tributary of Gallatin River. It is owned by the Big Sky Water and Sewer District No.363, P.O. Box 160670, Big Sky, Montana 59716, and is used for winter storage and seasonal golf course watering. Technical data pertaining to Big Sky Ponds and its structures can be obtained at the Big Sky Water and Sewer District Office in the Big Sky Meadow Village.

C. Access to Ponds

Big Sky Ponds are located off of Highway 64. Note that the highway may become flooded! The nearest telephone is at the Big Sky County Water & Sewer District maintenance building (995-2654) or filter building (995-2666) in the Meadow Village.

D. Hazard Area

The evacuation area extends from the Ponds along the West Fork of the Gallatin to a point about two miles downstream of the Big Sky Meadow Village, as shown in Appendix B. Hazards include the possible inundation of State Highway 64. Inundation and evacuation maps are in Appendix B.

E. Responsibility and Authority

Pursuant to the Dam Safety Act, Chapter 15 of Title 85, MCA, the dam owner is responsible for production, coordination, maintenance, and implementation of this emergency action plan. The extent of owner implementation was defined through coordination of this plan with the county sheriff and the disaster and emergency services (DES) coordinator.

F. Periodic Review/Update

The owner will review/update this EAP annually. Review/update by a qualified professional engineer will be accomplished as required by the dam's operating permit, but no less than every five years.

G. Approval

By my signature, I acknowledge that I, or my representative, has reviewed this plan and agree to the tasks and responsibilities assigned herein for my department and/or agency.

_____ _____

Signature Date

OWNER, BIG SKY COUNTY WATER & SEWER DISTRICT No.363

_____ _____

Signature Date

GALLATIN COUNTY SHERIFF'S DEPARTMENT

_____ _____

Signature Date

DISASTER AND EMERGENCY SERVICE

II. NOTIFICATION PROCEDURES

A. Imminent or Actual Failure

If Big Sky Dams IS FAILING, TWO THINGS MUST BE DONE IMMEDIATELY:

(1) Residents in the hazard area downstream from the dam must be warned according to the county warning plan, and initiated as shown in Figure 1, and

(2) any steps that might save the dam or reduce damage to the dam or hazard area downstream should be taken. (Refer to the map in Appendix B to determine the areas that are likely to be inundated if the dam fails).

FIGURE 1

BIG SKY PONDS
ACTUAL OR IMMINENT FAILURE
"NOTIFICATION FLOWCHART"

GALLATIN COUNTY SHERIFF
911

LOCAL DES COORDINATOR
NOTE: *Coordination of Evacuation will be coordinated by Sheriff and local DES coordinator*

GALLATIN COUNTY SHERIFFS DEPARTMENT
Jim Cashell: 582-2100

LOCAL DES COORDINATOR
Chuck Winn
582-2350

DAM OWNER
Mr. Ron Edwards
General Manager
Big Sky County Water & Sewer District
995-2660

DNRC DAM SAFETY
Scott Compton
Bozeman DNRC Office
Office- 586-3136
Home- 586-0738

Or

Terry Voeller
Office: 406-444-6664
Home: 406-442-9638

Or

Michele Lemieux
Office: 406-444-6613

As dam owner, it is your responsibility to:

1. Call the Sheriff's Dispatch Center (**911**) and Disaster and Emergency Services (**582-2350**), if they have not already been notified. Be sure to say, "This is an emergency." They will call other authorities and the media and begin the warning plan.
2. Warn anyone in immediate danger to evacuate to safety. This includes someone on the dam, directly below the dam, or boating on the reservoir, or downstream evacuees, if so directed by the sheriff.
3. Contact the Disaster and Emergency Services staff at least once every hour. They may request your assistance in evacuating residents.
4. If all means of communication are lost:
   a. Try to find out why
   b. Get someone else to try to reestablish communications. If these means fail, take care of immediate problems and send someone to get to another radio or telephone that works.

B. Potentially Hazardous Situation

A potentially hazardous situation is an event or condition not normally encountered in the routine operation of the dam and reservoir. Among the unusual occurrences that may affect the dam are dam embankment problems (see section B.2.), failure of the spillway or outlet works, heavy precipitation or rapid spring snow melt, landslides, earthquakes, erosion, theft, vandalism, acts of sabotage, and serious accidents. These occurrences may endanger the dam, the public, or the downstream valley and may necessitate a temporary or permanent revision of the dam's operating procedures. Help in these situations can be obtained by notifying those people shown in Figure 2.

FIGURE 2

BIG SKY PONDS
POTENTIALLY HAZARDOUS SITUATION
"NOTIFICATION FLOWCHART"

DAM OWNER
BIG SKY COUNTY WATER & SEWER DISTRICT
995-2660

DISASTER & EMERGENCY SERVICES
~~Chuck Winn~~ Patrick Lonergan
OFFICE: 582-2350

LOCAL ENGINEER
~~Per Hjalmarsson~~ Mark
OFFICE: 587-1115 or HOME: ~~586-0968~~ 587-4831

DAM SAFETY

~~Scott Compton~~ Kerri Strasheim
Bozeman DNRC Office
Office- 586-3136 ~~586-4504~~
Home- ~~586-0738~~
Cell- 579-2828 (24)

Terry Voeller Jim Beck
Helena DNRC Office
Office: 406-444-6664
Home: 406-442-9638

Michele Lemieux
Helena DNRC Office
Office: 406-444-6613
~~Home: 406-225-9062~~

1. If the dam owner discovers an unusual condition of the dam embankment that could threaten the structure:
   a. Have a qualified engineer inspect the dam as soon as possible to determine whether emergency action is necessary.
   b. Notify the county Disaster and Emergency Services Coordinator (**582-2350**) of the potential problem.
   c. Contact the Dam Safety Program (444-6664) of the Department of Natural Resources and Conservation (DNRC).

2. Among the conditions the dam owner should watch for are:
   a. Over topping of the dam by flood waters
   b. Loss of material from the dam crest due to storm wave erosion

c. Slides on either the upstream or downstream slope of the embankment as evidenced by:

   1. Sloughing
   2. Cracking
   3. Bulging
   4. Scarping

d. Erosion flows through, beneath, or around the embankment as evidenced by

   1. Excessive seepage
   2. Discoloration of the seepage
   3. Boils on the downstream side
   4. Sinkholes
   5. Changes in the flow from drains

e. Failure of outlets or spillways due to clogging or erosion

f. Movement of the dam on its foundation as evidenced by

   1. Misalignment
   2. Settlement
   3. Cracking

3. Before calling either an engineer or DNRC to report a problem, the dam owner will use the form in Appendix D to ensure sufficient information is provided for the engineer to analyze the problems. After talking to the engineer, it may be helpful to document the condition of the dam by making a sketch on the form in Appendix D, showing the extent of the problem. Revise the sketch periodically if the problem develops further. Section III includes further guidelines for courses of action to be taken to mitigate the effect of many problems.

C. Posting of the Notification Flowchart and Distribution of the EAP.

The Notification Flowchart is posted at the Big Sky Water and Sewer District Office No. 363. The Gallatin County Sheriff's Office and the Gallatin County DES Coordinator have copies of the plan.

III. MITIGATION ACTIONS

Besides normal monitoring of the dam's condition, which is done at least monthly, the owner will provide continuous monitoring and inspection during and after extreme events such as storms and earthquakes. Information on the magnitude of an earthquake or storm can be obtained from the DNRC Dam Safety Program ~~(444-6664)~~. Actions are suggested below to mitigate problems that may develop, but those actions should never be continued at the risk of injury or at the expense of lessening efforts related to evacuation. Monitoring should identify any of the following potential problems.

A. Potential Problems and Immediate Response Actions

1. OVERTOPPING BY FLOOD WATERS

a. Open the outlet to its maximum safe capacity.

b. Place sandbags along the crest to increase freeboard and force more water through the spillway and outlet.

c. Provide erosion-resistant protection to the downstream slope by placing plastic sheets or other materials over eroding areas.

d. Divert flood waters around the reservoir basin, if possible.

e. Create additional spillway capacity by making a controlled breach in a low embankment or dike section where the foundation materials are erosion-resistant.

2. LOSS OF FREEBOARD OR DAM CROSS SECTION DUE TO STORM WAVE EROSION

   a. Place additional riprap or sandbags in damaged areas to prevent further embankment erosion.

   b. Lower the water level to an elevation below the damaged area.

3. SLIDES IN THE UPSTREAM OR DOWNSTREAM SLOPE OF THE EMBANKMENT

a. Lower the water level at a rate and to an elevation considered safe, given the slope condition. If the outlet is damaged or blocked, pumping, siphoning, or a controlled breach may be required.

b. Stabilize slides on the downstream slope by

   1. weighting the toe area with additional soil, rock, or gravel, and then

   2. restoring lost freeboard by placing sandbags at the crest.

4. EROSIONAL FLOWS THROUGH THE EMBANKMENT, FOUNDATION, OR ABUTMENTS

   a. Plug the flow with whatever material is available (hay bales, bentonite, or plastic sheeting if the entrance to the leak is in the reservoir basin).

   b. Lower the water level until the flow decreases to a non-erosive velocity or stops.

   c. Place a protective sand-and-gravel filter or boil ring over the exit area to hold materials in place.

5. FAILURE OF APPURTENANT STRUCTURES SUCH AS OUTLETS OR SPILLWAYS

   a. Implement temporary measures to protect the damaged structure, such as closing an outlet or protecting a damaged spillway with riprap.

b. Lower the water level to a safe elevation. If the outlet is inoperable, pumping, siphoning, or a controlled breach may be required.

6. MASS MOVEMENT OF THE DAM ON ITS FOUNDATION (SPREADING OR MASS SLIDING FAILURE)

a. Immediately lower the water level until excessive movement stops.

7. EXCESSIVE SEEPAGE AND HIGH LEVEL SATURATION OF THE EMBANKMENT

a. Lower the water to a safe level.

b. Continue frequent monitoring for signs of slides, cracking or concentrated seepage.

8. SPILLWAY BACKCUTTING, THREATENING RESERVOIR EVACUATION

a. Reduce the flow over the spillway by fully opening the main outlet.

b. Provide temporary protection at the point of erosion by placing sandbags, riprap materials, or plastic sheets weighted with sandbags.

c. When the inflow subsides, lower the water to a safe level.

9. EXCESSIVE SETTLEMENT OF THE EMBANKMENT

a. Lower the water level by releasing it through the outlet pumping, siphoning, or a controlled breach.

b. If necessary, restore freeboard, preferably by placing sandbags.

B. Emergency Supplies and Resources

There is a supply of excess embankment fill (parent material) on the east side of the Pond 1 dike.

C. Local Contractors and Engineers

Local Contractors: Williams Excavation and Construction, 587-0969

Engineer: C & H Engineering and Surveying, Per Hjalmarsson

587-1115 (work) or 586-0978 (home)

APPENDICES

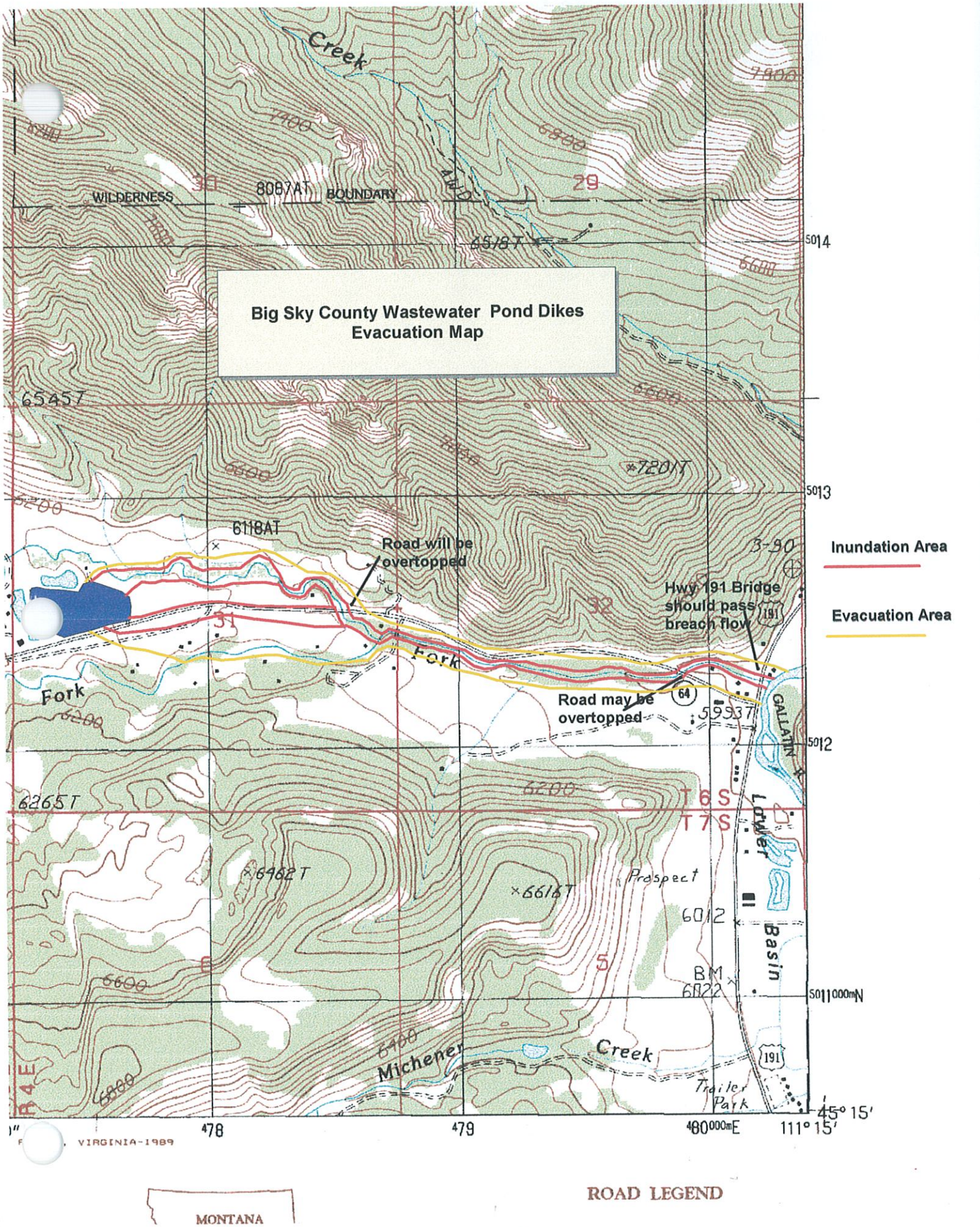
APPENDIX A Technical Data

APPENDIX A

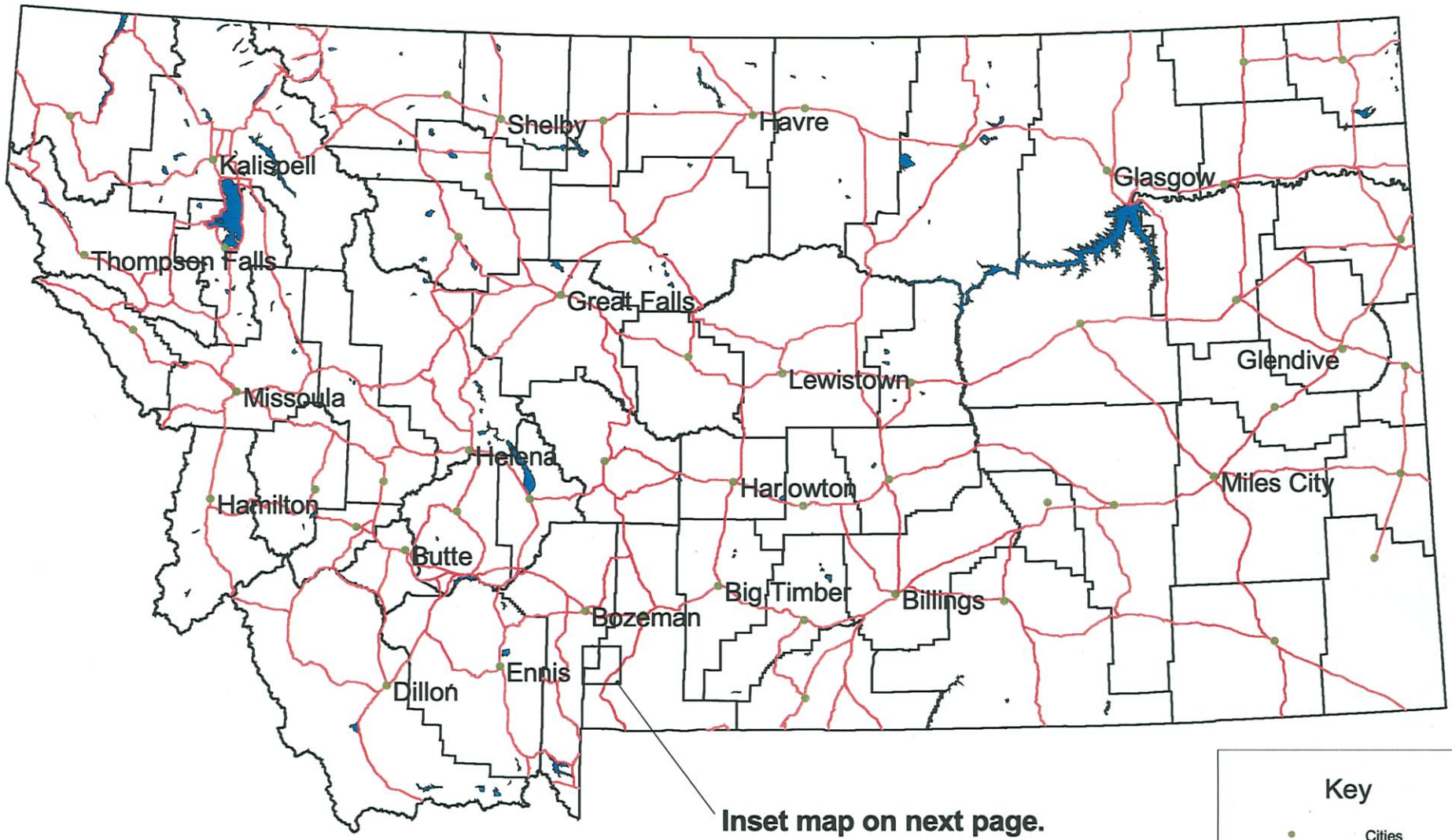
TECHNICAL DATA FOR BIG SKY DAMS

Reservoir Capacity at freeboard of Pond 1 and 3 respectively:	60.1 and 19.6 million gallons
Maximum Reservoir Capacity Measured to the Emergency Overflow Pipe for Pond 1 and Pond 3 respectively:	70.9 and 24 million gallons
Pond 1 and Pond 3 Crest Width:	8 feet
Base Width:	variable with maximum width at 28 feet
Length of Pond 1 and Pond 3 embankments:	1760 and 580 feet
Outlet Capacity:	13.2 cubic feet/second
Overflow Pipe Capacity:	24 cubic feet/second
Date Constructed:	1997
Slope of Upstream Face of Ponds:	3:1
Slope of Downstream Face of Ponds:	3:1

APPENDIX B Inundation & Evacuation Maps
To be Supplied By DNRC

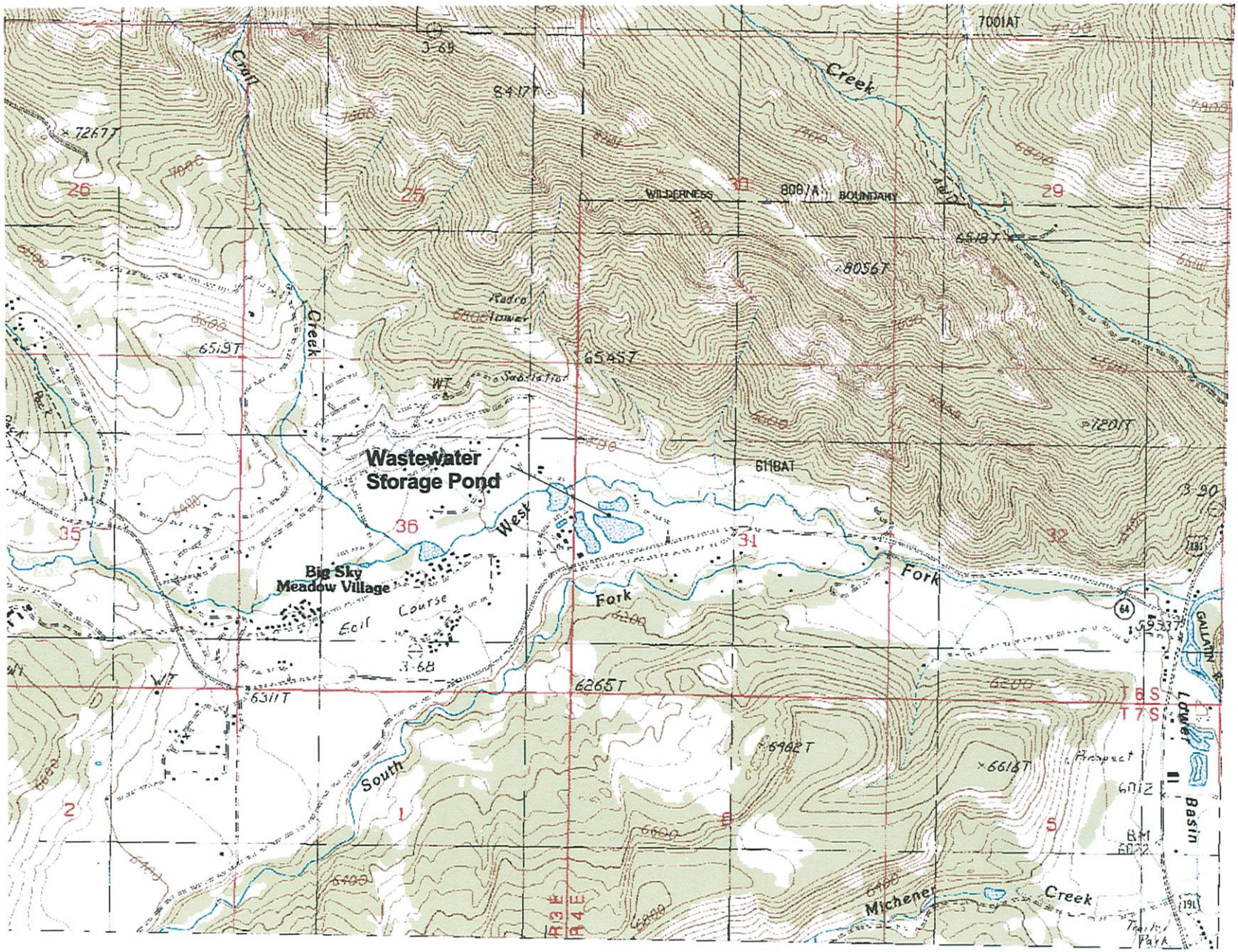

Big Sky County Wastewater Pond Dikes
Evacuation Map
Inundation Area
Evacuation Area
Road will be overtopped
Hwy 191 Bridge should pass breach flow
Road may be overtopped
WILDERNESS
BOUNDARY
Creek
Fork
Fork
Michener
Creek
Prospect
Basin
Lower
Trailer Park
GALLATIN R
T 6 S
T 7 S
R 4 E
6118AT
8087AT
6548T
6545T
6720T
6265T
6462T
6616T
5993T
6012
6022
BM
5014
5013
5012
5011 000mN
478
479
480 000mE
45° 15'
111° 15'
VIRGINIA-1989
MONTANA
ROAD LEGEND

Big Sky Overview Map



Kevin Premore--August 2001

Big Sky Inset Map



Big Sky Wastewater Storage Pond Evacuation Photos

* Inundation lines are estimates. Evacuations should be made well beyond this zone.

Photo 1 of 2

Key

Inundation Area

Approximate Scale: Photo = 1 mile

Kevin Premore
August, 2001

Inundation lines verified by_____ date_____.

Big Sky Wastewater Storage Pond Evacuation Photos

* Inundation lines are estimates. Evacuations should be made well beyond this zone.

Photo 2 of 2

Key

Inundation Area

Approximate Scale: Photo = 1 mile

APPENDIX C Telephone Directory

Appendix C
TELEPHONE DIRECTORY

1. PRIORITY ONE:
   1. SHERIFF Gallatin County 911
   2. Montana Disaster and Emergency Services (Helena) (406) 444-6911
   3. EVACUEES:

Allan & Betty Kass	995-2212
Austin & Mildred Carey	995-4243
Barbara Miner	995-4077
Brad & Josette Parsch	995-4946
Charles Hinz	995-2496
Dorothy Williams	995-4979
Cook Jones-Ring	995-4346
Dorothy Vick	587-4701
Faith Malpeli	995-4831
James & Sally Jude	200 Edgewater Dr., Coral Gables, FL 33133-6622
Jeffrey & Holly Hansen	238-6700
Joel Beardsley	P.O. Box 160756, Big Sky
John Fishbaugh	(Unlisted) 113 Sourdough Ridge Drive, Bozeman
Jonathan & Marjorie Knaub	995-4140
Lawrence & Birdie Keley	995-3230
Mark & Gettied Gilleland	587-7154
Martin & Sylvia Weber	995-4943
Melissa & Paul Cronin	995-4136
Paul Brourman	1706 West Wabansia Ave, Chicago, IL 60622
Ponderosa Land Development	(unlisted) P.O. Box 1310 Bozeman, MT 59771
Robert Olson	995-4342
Robert Kallestad	995-4991
Sherry & Jim Berry	25001 Lastle Wood, Lake Forest, CA 92630
Soldiers Chapel Corp.	995-4089
W. Glen & Okarche Vogel	587-0828
Westland Enterprises, Inc.	(Unlisted) P.O. Box 939, Bozeman, MT 59771
William Erwin, Jr.	995-2884

NOTE: Several of the residences have out of state owners, with possible renters. The home owners will have to be notified in order to notify the renters.

B. Priority Two

4. LOCAL ENGINEERS
C&H Engineering: Per Hjalmarsson 587-1115

5. MONTANA DEPT. OF NATURAL RESOURCES AND CONSERVATION

Dam Safety Program ..... Office: 444-6664

Michele Lemieux, (Soils and Embankments) ..... Office: 444-6613
..... Home: 225-9062

Terry Voeller (Spillways and Hydrology) ..... Office: 444-6664
..... Home: 442-9638

Scott Compton, (Bozeman Office) ..... Office: 586-3136
..... Home: 586-0738

6. NATIONAL WEATHER SERVICE

Helena 449-5204

Great Falls 453-2081

Billings 657-6988

7. BIG SKY COUNTY WATER & SEWER DISTRICT No.363

24 Hour Emergency Telephone Answering Service: 585-4000

Ron Edwards, General Manager: ..... Office: 995-2660
..... Home: 587-4093

Grant Burroughs, Superintendent of Wastewater Operations 995-2666

Jim Muscat, Superintendent of Water System Operations 995-2666

8. BUREAU OF LAND MANAGEMENT 657-6561

9. MONTANA DEPARTMENT OF STATE LANDS 444-2074

10. U.S. FOREST SERVICE 329-3176

APPENDIX D Dam Incident Report Form

APPENDIX D

DAM INCIDENT REPORT FORM

DATE:_____ TIME:_____

NAME OF
DAM:_____

STREAM NAME:_____

LOCATION:_____

COUNTY:_____

OBSERVER: _____

OBSERVER TELEPHONE:_____

NATURE OF
PROBLEM:_____
_____

LOCATION OF PROBLEM AREA (Looking
Downstream):_____
_____
_____

EXTENT OF PROBLEM AREA:_____
_____

FLOW QUANTITY AND COLOR: _____
_____

WATER LEVEL IN
RESERVOIR:_____

IS SITUATION WORSENING?
_____

EMERGENCY STATUS:_____

CURRENT WEATHER CONDITIONS:_____

APPENDIX E

Emergency Action Plan Distribution List

PLAN HOLDER NUMBER OF COPIES

Dam Owner, Big Sky Water and Sewer District No.363 1

Gallatin County Sheriff 1

Local DES Coordinator 1

DNRC Dam Safety Program 1